Technical Physics Letters 2016 vol.42 N2, pages 182-185

Formation of a periodic diffractive structure based on poly(methyl methacrylate) with ion-implanted silver nanoparticles

Galyautdinov M., Nuzhdin V., Fattakhov Y., Farrakhov B., Valeev V., Osin Y., Stepanov A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Pleiades Publishing, Ltd.We propose to form optical diffractive elements on the surface of poly(methyl methacrylate) (PMMA) by implanting the polymer with silver ions (E = 30 keV; D = 5.0 × 1014 to 1.5 × 1017 ion/cm2; I = 2 μA/cm2) through a nickel grid (mask). Ion implantation leads to the nucleation and growth of silver nanoparticles in unmasked regions of the polymer. The formation of periodic surface microstructures during local sputtering of the polymer by incident ions was monitored using an optical microscope. The diffraction efficiency of obtained gratings is demonstrated under conditions of their probing with semiconductor laser radiation in the visible spectral range.

http://dx.doi.org/10.1134/S1063785016020255